PHILIP MORRIS
U.S.A.
INTER-OFFICE CORRESPONDENCE
RICHMOND, VIRGINIA

To: Dr. T. S. Osdene

Date: December 28, 1973

From: D. A. Lowitz

Subject:

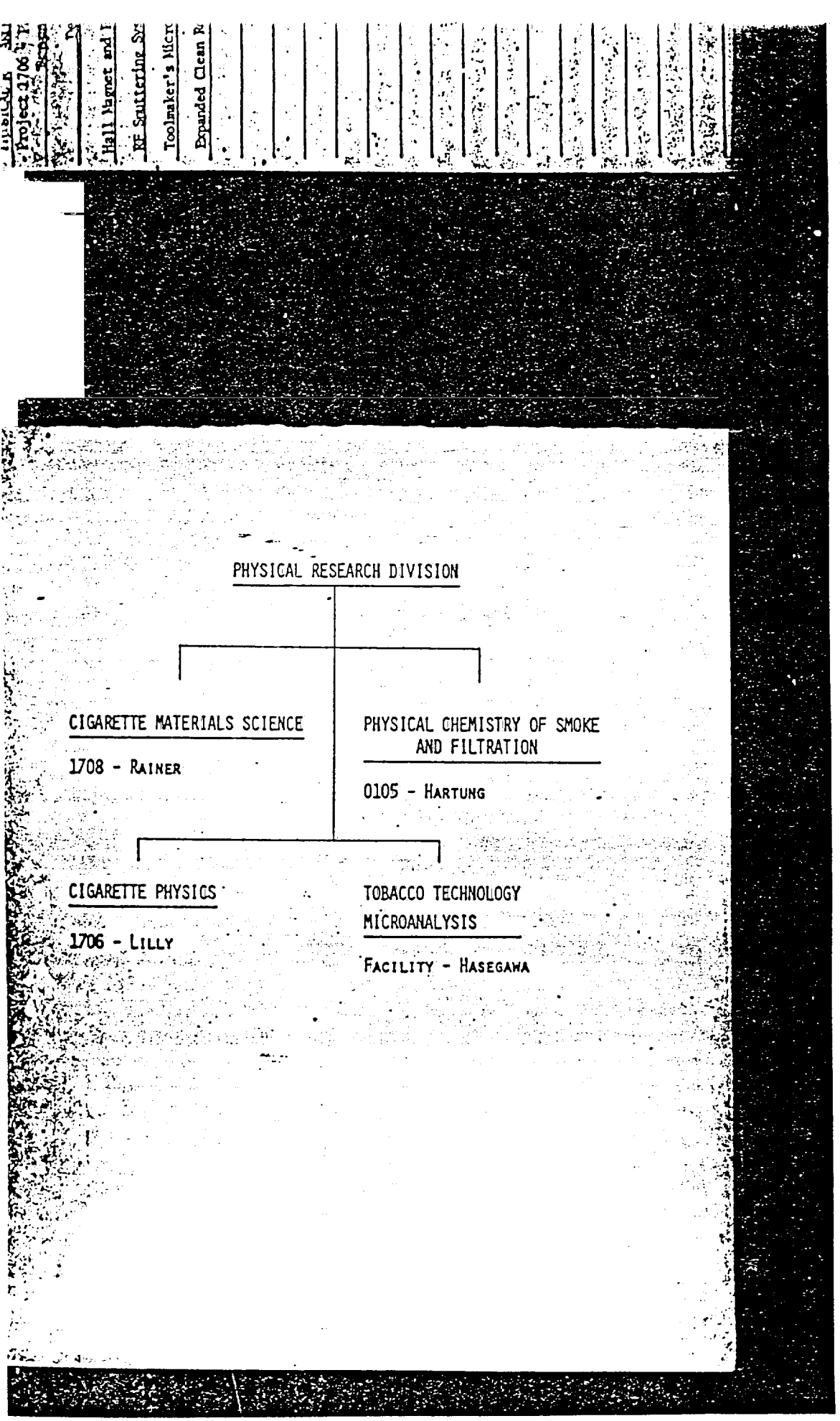
PROGRAMS AND OBJECTIVES
OF THE
PHYSICAL RESEARCH DIVISION
FOR 1974

cc: Dr. H. R. Wakeham
Mr. F. B. Resnik
Mr. R. N. Thomson
Mr. K. S. Burns
Mr. F. L. Daylor
Dr. P. A. Eichorn
Dr. W. F. Gannon
Mr. B. J. Kosakowski
Mr. L. F. Meyers
Mr. W. F. Mutter
Mr. J. S. Osmalov
Dr. F. Will, III

Welch Fore Pump for
Ion Pump Isolation V
Lock-in Amplifier
Pulse Generator
Audio Function Gener
Miscellaneous Electr
Chip Border (O_2 Sens

1001514923

Source: https://www.industrydocuments.ucsf.edu/docs/qrgk0000



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PHYSICAL RESEARCH DI

Materials Science - Response

Desc

High Vacuum Pump Sta

Vacuum Guage Control

RF Generator

Light Microscope

Glass Vacuum System

Mechanical Propertie

Telsec "Betaprobe" M analyzer

Catalyst surface stu

1708

CIGARETTE MATERIALS SCIENCE

Personnel Training: Organic chemistry, inorganic chemistry, reaction mechanisms, polymer chemistry, surface chemistry and physics, heterogeneous catalysis.

Objective: Search out new materials for filter systems and new treatments of smoking materials to reduce undesirable elements in smoke, to add flavor and aroma to smoke, and to reduce the cost of cigarette production.

Program:

(Goal 1) 1. Permanganate/alumina (Stoichiometric) $\longrightarrow$ NO_x, HCN, aldehyde removal

(Goal 3) 2. Study of the active sites in tobacco responsible for the sorption and retention of menthol.

(Goal 1) 3. Chlorite/alumina (Stoichiometric) $\longrightarrow$ NO_x removal.

(Goal 2 & 5) 4. Chemical treatments of Ecusta paper filters for flavor improvement.

(Goal 3 & 5) 5. Systems for controlled release of menthol and other flavors.

a. grafting to cellulose
b. treatment of cellulose with cryogenic NH_3

(Goal 2 & 4) 6. Carbon fiber filler in rod $\longrightarrow$ reduced delivery and cost reduction.

(Goal 6) 7. Compounds added to tobacco filler $\longrightarrow$ CO reduction.

(Goal 6 & 4) 8. Chemical modification of stems, cigarette wrap paper, and naturally occurring carbohydrates for improved flavor.

(Goal 1) 9. New filter materials for the selective removal of CO, NO_x and aldehydes.

Project Leader: Dr. N. B. Rainer, Senior Scientist
Dr. C. B. Hoelzel, Research Scientist
Dr. T. E. Majewski, Research Scientist
Mr. D. A. Full, Assistant Scientist
Mr. P. A. Wilson, Specialist
One Research Professional to be hired in 1973.

Goals 1.) Selective filtration; 2.) 10 mg. Marlboro; 3.) Menthol cigarette; 4.) Processing cost reduction; 5.) New products; 6.) Selective delivery.

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Source: https://www.industrydocuments.ucsf.edu/docs/qrgk0000

Materials Scienc
Proc
Additional Sputt
multiple coating
(Possibly to be
for production &
possibly to be r
with sensor grou
requirement.)
Whittaker-Space
(Depending on ou
(Possible Staunt
ESCA (Electron S
outcome of explo
applied in work
Committed power
meter to release
analyses

1706

CIGARETTE PHYSICS

Personnel Training: Solid state physics, mathematical physics, thermal physics, experimental physics, surface physics, physical chemistry, chemical physics.

Objective: 1. Develop understanding of how specific species of smoke are generated and compose adequate design equations for the process to generate new products.

2. Determine how specific filter material candidates function and assist in making them suitable for practical filters.

Program:

(Goal 1, 3 and 4) 1. Cigarette design
- a. measurement of relevant rod properties
  - i. DTA of rod combustion at high heating rate
  - ii. Temperature distribution in solid & vapor phase
  - iii. Smoke composition as a function of position in rod
  - iv. Cigarette output as a function of flow rate, puff volume, filter type, paper porosity
- b. Derive and solve smoke process equations
- c. design new products

} Reduce concentration of less desirable elements of smoke, also normal flavor-low tar cigarette design.

(Goal 2&3) 2. Stability improvement of new filter mterial candidates

(Goal 1&3) 3. Characterization of flow through filters under actual conditions ⟶ smoker acceptability of filter and filter design.

Project Leader: Mr. A. C. Lilly, Senior Scientist
Mr. E. M. Gentry, Assistant Scientist
Mr. H. V. Lanzillotti, Assoc. Scientist
Mr. B. C. LaRoy, Research Scientist
Mr. S. L. Thurston, Specialist
Dr. J. C. Crump, Research Scientist
Dr. A. J. Kassman, Research Scientist
Mr. C. O. Tiller, Research Scientist
Mr. L. C. Bartlam, Specialist
Mr. A. R. Wayte, Senior Technician
Dr. J. C. Schug, Consultant - $900
Dr. D. T. Sawyer, Consultant - $500
One Research Prof. to be hired in 1973.

Goals
1. 10 mg. Marlboro-like cigarette
2. Selective filtration
3. New products
4. Selective delivery

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Microstructure Facil
Misc. x-ray tubes, P
Freeze etching devic
X-ray generator

0105

PHYSICAL CHEMISTRY OF SMOKE AND FILTRATION

Personnel Training: Physical chemistry, kinetics

Objective: Determine how filters function adequately so that selective filtration systems can be developed. Establish how cigarette smoke and cigarette rod characteristics are related adequately to permit new cigarette products to be designed prior to their fabrication.

Program:

(Goal 2&3) 1. Selective Filtration

a. Gas chromatography → sorption kinetics, filter free space characterization
b. Fixed Bed Adsorber → Sorption Kinetics
c. Particle size effects → composition variation with particle size

(Goal 1, 3 & 4) 2. Smoke-rod mathematical relationships → cigarette modelling

(Goal 1) 3. Smoke flavor and tar fractionation → low tar - normal flavor cigarette

Project Leader: Dr. H. A. Hartung, Senior Professional
Mr. J. F. Bebbs, Assistant Professional
Mr. R. W. Dwyer, Associate Professional
Mrs. Ruth Kaiser, Senior Technician
Mr. J. S. Osborne, Research Professional
Mr. D. L. Simpson, Research Professional
Mr. L. L. Stewart, Research Professional
Dr. D. T. Sawyer, Consultant - $500
Dr. J. C. Schug, Consultant - $500
One senior professional to be hired in 1974 as a replacement for Dr. C. G. Dodd

Goals

1. 10mg. Marlboro
2. Selective filtration
3. New products
4. Selective delivery by rod

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Source: https://www.industrydocuments.ucsf.edu/docs/qrgk0000

FINSICAL RESEARCH
Microstructure Faci
Electron Microprobe
X-ray tube replacem

TOBACCO TECHNOLOGY MICROANALYSIS

Personnel Training: Biophysics, microinstrumentation, experimental physics

Objective: Provide R&D with microstructure and microgeometry analytic services

Program:

1. Microgeometry of filters, tobacco, filter materials, biological specimens, paper, etc.
   a. scanning electron microscopy
   b. transmission electron microscopy
   c. optical microscopy
   d. develop techniques for preceding
2. Microstructure of filter surfaces and filter materials
   a. microprobe analysis
   b. photoelectron spectroscopy
   c. x-ray analysis
   d. develop new techniques for preceding

Facility Leader: Mr. I. Hasegawa, Senior Professional
Mr. W. L. Carter, Research Professional
Mrs. Virginia Johnson, Associate Professional
Mrs. Laura McCray, Assistant Professional
Mr. D. L. Petri, Specialist
Mrs. Marie Smith, Specialist
General EM Consultants - $500

Applications:

Scanning Electron Microscopy

1. Filtration and filter studies
2. Selective filtration
3. Expanded leaf
4. B. L. studies

Transmission Electron Microscopy

1. Filtration and filter studies
2. Selective filtration (particle size distribution studies)
3. Expanded leaf
4. Biological studies (effect of smoke constituents on yeast cells and other tissue)

Optical Microscopy

1. Filter studies
2. Expanded leaf
3. Trouble-shooting in manufacturing, e.g. studies of mold in tobacco

1001514928

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PHILIP MORRIS
U.S.A.
INTER-OFFICE CORRESPONDENCE
RICHMOND, VIRGINIA

To: DR. T. S. OSDENE
From: D. A. LORITZ
Date: JANUARY 2, 1973

4. Examination of competitors' products
5. Almost every aspect of the cigarette business

Microprobe Analysis

1. Filtration studies (different composition as a function of particle size) (Analysis of deposition on filter and of filter surface)

X-Ray Analysis

1. Selective filters (structure of catalysts in filters and selective absorbents)
2. Expanded leaf studies, e.g. ammonium carbonate studies

ESCA

1. Filtration studies
   a. Different composition as a function of particle size
   b. Composition of deposition on filter surface, also question of whether chemisorption is occurring.

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